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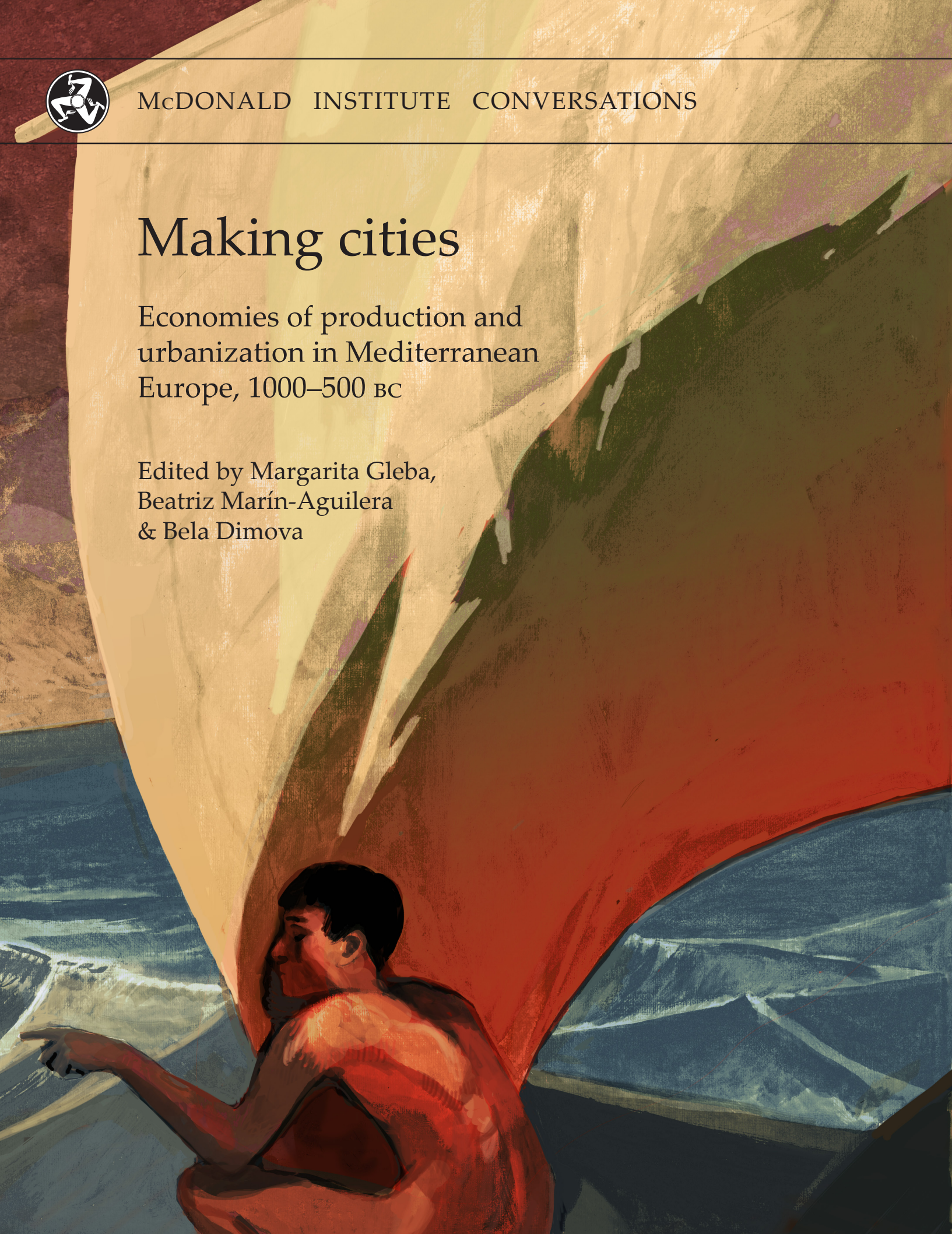


McDONALD INSTITUTE CONVERSATIONS

Making cities

Economies of production and
urbanization in Mediterranean
Europe, 1000–500 BC

Edited by Margarita Gleba,
Beatriz Marín-Aguilera
& Bela Dimova



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Chapter 17

The Etruscan *pithos* revolution

Phil Perkins

In the Etruscan world, a distinctive class of artefact is the *pithos*, a large ceramic container. They are frequently found, but not often studied, on Etruscan sites in central Italy from at least the seventh to the second centuries BC. This study, based on 3393 published examples from 921 sites, will investigate their occurrence and interpret their significance in the context of the urban, social and economic development of Etruria. Despite their frequency, to the best of my knowledge, this is the first study that systematically investigates this class of artefact throughout Etruria. Consequently, I will explore the total trajectory of the social life of *pithoi* from production to exchange, distribution, consumption (Appadurai 1986, 13) and subsequent reuse and disposal, constructing a kind of biography for *pithoi* (Kopytoff 1986). In addition to outlining their fundamental role in economic production, I will argue that *pithoi* were also important in the development and functioning of settlement systems and rural infrastructure, playing a vital part in some of the earliest urban development in Europe, and contributing to a phase of economic growth in pre-Roman Italy.

The development of *pithos* technology changed Etruria and other parts of the Mediterranean world by enhancing the production and storage of agricultural produce. I will argue that the widespread adoption of *pithos*-based agricultural systems was a significant enabling technology for urban living through the agricultural intensification that it made possible. The *pithos* operated in two significant ways, as a fixed storage facility, and as a vessel for processing agricultural produce into secondary products. Further uses are also documented but have a lesser economic significance. Current explanations of urbanism in Etruria tend to focus on social dynamics, mineral resource exploitation and the built environment; I will explore some of the economic aspects of the urban turn in Etruria. A key focus will be investigation how this new ceramic

technology enabled agricultural intensification and was socially embedded in a pre-monetary economy.

This study will start by discussing the *pithos* as an artefact in its own right, considering formal and technological characteristics. Then I will consider the agency of these large ceramics investigating how they were made and used, and what they enabled in the Etruscan world. In dialogue with Robb's (2018) abstract discussion of containers in the archaeological record, the Etruscan *pithos* may in practice be considered a multifunctional container that is defined by what it groups and preserves. Containing grain, wine, metal artefacts for recycling or human remains and grave goods created a different function for the *pithos*. *Pithoi* as containers did not exist in isolation, they were interdependent with what they contained. They were not conceived and produced as an end in themselves: *pithoi* were made for specific purposes but could also be multifunctional. When filled, their contents transform the agency of their container – during its life, a *pithos* might be a fermentation vessel, a grain container or a burial chamber. *Pithoi* actively organized their contents spatially and quantitatively, enabling storage, management and accounting of economic produce. The facilitation of stockpiling and the creation of silos gave *pithoi* the agency to generate political intensification by enabling the manipulation of the value of their contents in changing economic circumstances. They also provided a mechanism for transmitting wealth from one Etruscan social group or generation to the next, either by the direct storage of commodities or by the transfer of control of their productive function from one to another as part of the economic infrastructure. *Pithoi* also functioned as transformative machines enabling new processes to take place, transforming primary agricultural produce into secondary produce. *Pithoi* also had the agency to transform time, enabling produce to be stored for future use from one season to

the next, either by simply acting as a storage container, as with grain for example, or by acting as a machine that enabled the modification of produce for future use or redistribution, for example through fermentation of grape juice. *Pithoi* effectively enabled speeding up or slowing down various processes of preservation or modification, that created a beneficial economic yield (Robb 2018, 34). I will argue that this transformative power was a factor in agricultural and urban development enabling various economic and social processes that made the Etruscan economy dynamic.

The *pithos* as artefact

Pithoi and large storage jars were not unique to Etruria, or even central Italy. They originated in the Neolithic period and they are found over a wide area of south-west Asia, the eastern and central Mediterranean in the Bronze Age (Cullen 1990; Guglielmino 1999; Christakis 1999; 2005; 2008; Giannopoulou 2010, 35–40; Bevan 2018). Their origin is not the focus here, and it is inherently unlikely that the large ceramic storage vessel had a unique point of origin. Evidence from the shipwreck at Ulu Burun and elsewhere (Pulak 1988, 11–3; Shai *et al.* 2019) illustrates their early mobility across the Mediterranean and demonstrates that Bronze Age technology could transport *pithoi* across the sea as containers. The technology and skills required for their manufacture were also mobile and were transferred to southern Italy from the Aegean in the Late Bronze Age (Schiappelli 2015). Cultural contact and personal mobility certainly played a role in the transfer of technology in the second and first millennia BC but, where there is good evidence, the process is more complex than a straightforward immigration of artisans, the copying of imported models or an abstracted *lux ex oriente* form of Hellenization (Ridgway 2009, 16–19).

In Etruscan archaeology, the *pithos* (from the Greek) is also known as a *dolium* from the Latin or *dolio* (and occasionally *ziro* or *orcio*) from the Italian. An Etruscan name has been proposed from a graffito on a *pithos* with relief decoration and a ribbed body from Cerveteri, ‘*mi mamarce larnas’ sachus*’ (‘I (am), the *larnas* of Marcus Sacus’) (ET Cr 2.40), *larnas* presumably deriving from the Greek *larnax* (box, chest), although this identification is by no means certain (Colonna 1978; Biondi 1992, 69–71; Benelli & Bellelli 2009, 144–5; Serra Ridgway 2010, 125–6).

Typically, in Etruscan archaeology *pithoi* are defined as vessels with a diameter of greater than 30 cm and wall thickness of at least 2 cm. This definition creates some overlap with large storage jars with similar shapes that also reach these dimensions. Here, a definition of a vessel with a rim diameter of more

than 40 cm is used as an approximation, although large diameter rim sherds can be difficult to measure. This excludes smaller *pithos*-like jars such as the Vulcentean *olla a rete* (Medori 2012) or the plain or ribbed red *impasto* large *olle* made in and around Cerveteri (ten Kortenaar 2011, 100–5, fig. 22), even though they have a similar shape to the larger *pithoi*. At Cerveteri, it has been suggested that there were three sizes – large c. 1.3 m high, the most common medium c. 0.80 m high, and small c. 0.60–0.80 m, although there was not a clear-cut difference between these and the largest storage jars (Nardi 1993).

Easily fragmented unremarkable *pithos* sherds are frequently difficult to distinguish from fragments of curved roof tile. Often, they have not been well studied: many excavations or field surveys have not recognized them as a separate class of artefact. Some publications simply note their presence although more recent works have produced typologies for individual sites for example at Caere (Nardi 1993), Tarquinia (Mordeglia 2001), Roselle (Ristori 1994), Castellina del Marangone (Montanel Tramulla 2011), the Albegna Valley / Ager Cosanus (Perkins 1999), the University of Siena *Carta archeologica della provincia di Siena*, Poggio Civitella (Cappuccini *et al.* 2014, 57–8) and in the Po Valley (Mattioli 2013). The following analysis draws on this work and other isolated examples, to build a typology based on the shapes of the rims of the *pithoi*. There are too few complete examples to base a typology on the body shapes that vary between globular, ovoid, piriform or cylindrical. Six basic types with three sub-types are identified, each is described and approximately dated (Fig. 17.1, Tables 17.1–17.9). The types here are cross-referenced to any local types assigned in their original publication and find spots are listed in Etruria and the Etruscan Po Valley from south to north with references to descriptions and illustrations.

Bodies are typically ovoid but often globular or sometimes nearly cylindrical. Sometimes they are decorated with plain cordons or cordons impressed with a finger or tool, at times forming a rope-like pattern. These may act as reinforcements at the junctions of slabs or coils used to build the vessel walls (Giachi 1987, fig. 122, no. 301; Mordeglia 2001, fig. 70). Rarely, cordons may be more elaborate and more like architectural mouldings (Perkins & Walker 1990, fig. 37, no. 10; Giannopoulou 2010, 66–72; Montanel Tramulla 2011, fig. 228, no. 13). There are occasional bosses on the shoulders of some *pithoi* (Bocci Paccini 1978, fig. 7 no. 3).

Handles are unusual on *pithoi*. Some have bosses, circular or ring appliqués that may have served as a handle. An example from Sarteano has two loop

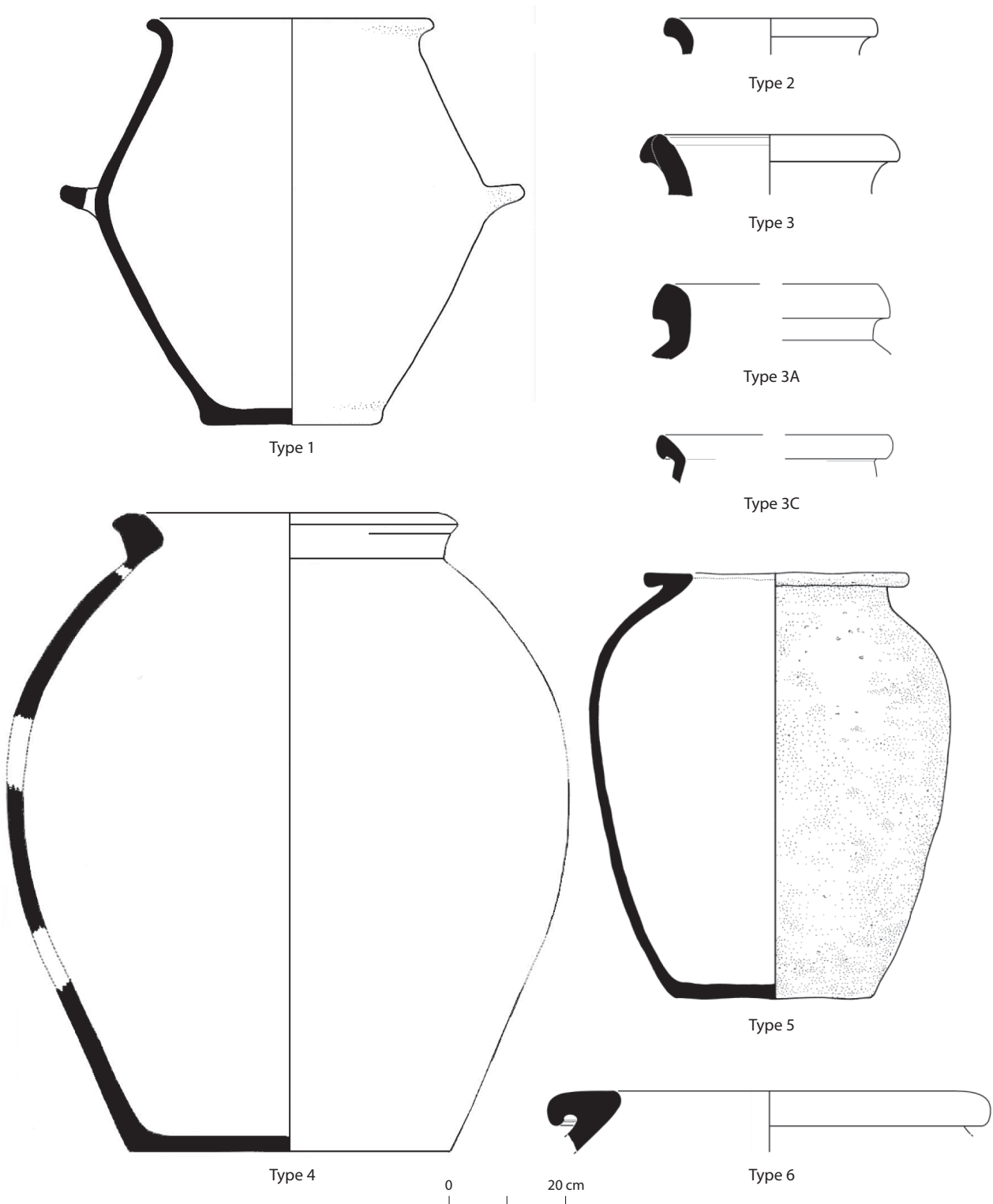


Figure 17.1. Pithos types 1–6: Type 1 (1:4) (redrawn from Persiani 2009, fig. 6, R25). Type 2 (redrawn from Perkins & Attolini 1992, fig. 16, no. 2). Type 3 (redrawn from Perkins & Attolini 1992, fig. 16, no. 1). Type 3A (redrawn from Perkins & Walker 1990, fig 34, no. 1) approximate diameter, Type 3C (redrawn from Perkins & Walker 1990, fig. 35, no. 3) approximate diameter. Type 4 (redrawn from Mordegliia 2001, fig. 67). Type 5 (Poggio Colla, unpublished 02-109 drawn by J. Boscarino). Type 6 (Poggio Colla, unpublished 02-188 drawn by A. Hooton).

Table 17.1. *Type 1 – Plain everted rim with either rounded or squared edge to the lip. This simple form can be traced back to at least the Bronze Age with a biconical, ovoid or globular body. It is sometimes decorated with lugs or impressed cordons. Date: Late Bronze Age – seventh century BC.*

Site	Local type	Reference
La Mattonara A, Civitavecchia	-	Pascucci 1998, 89, fig. 17.5, 95, fig. 21.5
Tarquinia	5	Mordeglia 2001, 152–3, fig. 69A
Pitigliano	-	Aranguren <i>et al.</i> 1985, fig. 17.3
Lake Bolsena	-	Persiani 2009, 46–7 fig. 6, R15, R25, fig.3
Scarlino site 17	-	Cucini 1985, 107ff, fig. 6.10
Monteriggioni	-	Acconcia 2004, fig.12 no. 4; Pinzuti 2004, fig. 21, nos. 41, 44
Monteriggioni: Casone	-	Bianchi Bandinelli 1931, 19, fig. 14

Table 17.2. *Type 2 – Everted, with a rounded or thinned rim profile that often has a distinct edge at the lower margin of the rim and sometimes slightly overhangs. Date: Late Iron Age – Archaic.*

Site	Local type	Reference
Casale Pian Roseto	J8–9	Murray Threipland & Torelli 1970, 82, fig. 29.8–9
Caere	1 and 2	Nardi 1993, 352–5, fig. 538–9
Castellina del Marangone	-	Montanel Tramulla 2011, 673 no. 23, fig. 229.22
La Mattonara A, Civitavecchia	-	Pascucci 1998, 95, fig. 17.6
Tarquinia	group 1	Mordeglia 2001, 150, fig. 64
Doganella	coarseware 1, type 1	Perkins & Attolini 1992, 101–3, fig. 16, nos. 2–3
Roselle	3	Bocci Paccini 1978, fig. 7 no. 3; Ristori 1994, 111, type 3
Lago dell' Accesa	1	Camporeale 1997, 99–100, fig. 12.5
Poggio Civitate di Murlo	form N2	Bouloumié-Marique 1978, fig. 23, nos. 338–9
Gubbio	-	Germini 2011, fig. 10, no. 4
Monteriggioni	-	Acconcia 2004, fig. 12, no. 3
Pisa	-	Bonamici 1989, 1139–41, fig. 3, nos. 1–2
Sesto Fiorentino	-	Settesoldi 2000, fig. 67, no. 5
Modena	1	Ferri & Losi 1988, 29, fig. 10.4

handles and two lug handles with a central depression (Caffarello 1984, 74–5, fig. 34). A large lug has been associated with *pithoi* at Fidene, Tarquinia and Doganella (Perkins & Walker 1990, fig. 37, no. 12; Mordeglia 2001, fig. 70, no. 3/545; di Gennaro *et al.* 2009, fig. 9, nos. 3–4).

Bases are flat and without any elaboration (Perkins & Walker 1990, fig. 35, no. 8; Campana 2001, type A1, fig. 18, no. 6; Montanel Tramulla 2011, figs. 228, nos. 14–5, 29, no. 20). Occasionally, bases were pierced to aid draining and cleaning the *pithos*.

Few lids have been recorded. Examples have plain flat edges or a raised lip. The only known lid handles are three cylindrical bosses near to the edge of the lids, and an example from Ghiaccioforte has a finger-inscribed circle in the centre (Perkins & Walker 1990, 40, fig. 37, no. 3; Sassatelli & Briquel 1994, 59, fig. 9, no. 69; Firmati & Rendini 2002, 84; Sabbatini 2014, 116, fig. 1 no. 51). Fabric or timber lids or slabs of stone are likely to have been used to seal storage

jars as they were in some burials at Chiusi (Salvini *et al.* 2015, 109, 13).

Marks are exceedingly rare on Etruscan *pithoi*: a graffito 'A' has been published on the wall of a *pithos* from Marzabotto (Gaucci & Sassatelli 2010, 352, no. 458, figs. 289, 306), and some further examples are discussed below.

Pithoi do not usually provide very good dating evidence. Their rim shapes are long-lived and not sensitive to chronological change. Half a century ago, Kahane *et al.* (1968, 8) outlined a general pattern of development in the Ager Veientanus from everted rims, here types 1 and 2, through rounded rim-forms, type 3, to angular, flat-topped rims, types 4–6, that further develop in the Roman period. In Etruria, *pithoi* are first found in the Bronze Age and some early Orientalizing tombs that provide early dates at Cerveteri are Casaletti di Ceri tomb 2 (Colonna 1968, 268 no.18), the Regolini-Galassi tomb (Pareti 1947) or tomb 2 of tumulus 1 at Banditaccia (Vighi & Ricci 1955) at Caere.

Table 17.3. *Type 3 – Everted and thickened with a rounded or thinned rim profile that may have a distinct edge at the lower margin of the rim and sometimes slightly overhangs. Date: Late Iron Age – Archaic.*

Site	Local type	Reference
Satricum	class II type 8	Attema <i>et al.</i> 2001–2002, fig. 4, no. 1813
Casale Pian Roseto	J7	Murray Threipland & Torelli 1970, 82, fig. 29.7
Caere	3	Nardi 1993, 355–9, figs. 539–40
Castellina del Marangone	-	Montanel Tramulla 2011, fig. 228, no. 12, 29, no.12
La Mattonara A, Civitavecchia	-	Pascucci 1998, 83, fig. 11.3
Tarquinia	group 2	Mordeglia 2001, 151–2, figs. 65–6
Albegna Valley	3	Perkins 1999, fig. 6.2.4, no. 1
Doganella	coarseware 1, type 3	Perkins & Walker 1990, fig. 33, nos. 5–7
Fonteblanda	-	Ciampoltrini 2016, fig. 34, nos. 1–3
Podere Tartuchino	-	Perkins & Attolini 1992, 101–3, figs. 15, nos. 22–4, 16, nos. 1, 5
Roselle	4	Ristori 1994, 111–12
Sarteano	Minetti 1 and 2	Caffarello 1984, 75, fig. 40; Minetti 2004, 459–60; Salvini <i>et al.</i> 2015
Poggio Civitella	3 and 4	Cappuccini <i>et al.</i> 2014, fig. 43, PC4356, fig. 44, PC2917
Pienza	-	Felici 2004, fig. 7 no. 2
San Giovanni d’Asso	-	Felici 2012, 192, fig. 3.1–2
Poggio Civitate di Murlo	N3 and Campana A1–4	Bouloumié-Marique 1978, fig. 23; Campana 2001, figs. 9.1–6, 8–9, 10.1–2, 7
Monteriggioni	-	Pinzuti 2004, fig. 21, no. 2; Zannoni 2000, fig. 70, no. 3
Artimino	1	Giachi 1987, 172–4, fig. 22, no. 301
Carmignano	-	Perazzi & Poggesi 2011, 380, fig. 9
Gonfienti	-	Perazzi & Poggesi 2011, 315, fig. 7
Marzabotto	I,4,a and DOL 1	Massa-Pairault <i>et al.</i> 1997, 185, fig. 22.12; Mattioli 2010, 149–50

Table 17.4. *Type 3A – Thickened and rolled rim with a cylindrical neck. Date: Archaic.*

Site	Local type	Reference
Caere	6	Nardi 1993, 359, fig. 540
San Giovenale	–	Backe-Forsberg 2005, fig. 84, no. 26
Tarquinia	group 4	Mordeglia 2001, 152, fig. 68B
Doganella	coarseware 1 and 5, type 4	Perkins & Walker 1990, fig. 33, no. 8, 34, nos. 1–5, 39, no. 5
Podere Tartuchino	-	Perkins & Attolini 1992, 101–3, fig. 16, no. 4
Lago dell’Accesa	type 2a	Camporeale 1997, 101, fig. 13.3
San Giovanni d’Asso	-	Felici 2012, 192, fig. 3.3–4
Poggio Civitate di Murlo	N4 and Campana A2.6	Bouloumié-Marique 1978, type, fig. 23; Campana 2001, fig. 10.3
Monteriggioni	-	Catucci 2004, fig. 8, no. 1
Volterra	-	Pistolesi 2003, 244, fig. 12.6
Artimino	1	Giachi 1987, 172–4, fig. 21, no. 300
Marzabotto	I,6,g and DOL2	Massa-Pairault <i>et al.</i> 1997; Mattioli 2010, 149–50

Table 17.5. *Type 3B – Thickened and rolled rim with an incurving shoulder and no distinct neck. Date: Archaic.*

Site	Local type	Reference
Murlo	A.1–5, B.2	Campana 2001, figs. 9. no. 7, 18, nos. 1–5
Volterra	-	Pistolesi 2003, 244, fig. 12.7
Artimino	3	Giachi 1987, 165, fig. 16, no. 275
Nonantolana site 68	-	Cardarelli & Malnati 2003, 118, fig. 61, no.11

Table 17.6. *Type 3C – Thickened and rolled with slightly overhanging hooked rim. Date: Archaic.*

Site	Local type	Reference
Casale Pian Roseto	J4–6	Murray Threipland & Torelli 1970, 82, fig. 29.4–6
Castellina del Marangone	-	Montanel Tramulla 2011, fig. 228, no. 11
Doganella	coarseware 1 and 5, type 5	Perkins & Walker 1990, fig. 30, no. 8, 34, no. 6, 35, nos. 1–3
Roselle	5	Ristori 1994, 112

Table 17.7. *Type 4 – Large thickened and everted rim with a flattened or rolled top and a generally triangular cross section. The details are variable, but the massiveness of the rim is a common factor. Date: Late Iron Age – Roman.*

Site	Local type	Reference
Satricum	class II type 7	Attema <i>et al.</i> 2001–2002, fig. 4, nos. 5151, 4859
Fidenae	-	di Gennaro <i>et al.</i> 2009, 154, fig. 9, nos. 2–5
Veii	-	Bartoloni 2009, fig. 21.1–2; Murray Threipland 1963, figs. 6, no. 7, 11, no.3, 18, no.1
Caere	4	Nardi 1993, 359, figs. 540
Castellina del Marangone	-	Montanel Tramulla 2011, fig. 228, no. 10
La Mattonara A, Civitavecchia	-	Pascucci 1998, 95, fig. 17.8
Tarquinia	group 3	Mordeglia 2001, 152, figs. 67–8A
Albegna Valley	20	Perkins 1999, fig. 6.2.4, no. 5
Doganella	coarseware 4, type 3	Perkins & Walker 1990, fig. 37, no. 9
Roselle	7	Ristori 1994, 113
Radico-fani	-	Botarelli 2004, fig. 3, no.10
Poggio Civitella	1b	Cappuccini <i>et al.</i> 2014, fig. 42, PC5483, fig. 43, PC834
Monteriggioni	-	Acconcia 2004, fig. 12, no. 5; Pinzuti 2004, fig. 21, no. 5
Pisa	-	Bonamici 1989, fig. 3, no. 4
Fiesole	-	De Marinis 1990, fig. 53, no. 3
Prato, La Pietà	-	Perazzi & Poggesi 2011, 275, fig. 6
Sesto Fiorentino	-	Settesoldi 2000, fig. 67, no. 6; Zannoni 2000, fig. 70, no. 3
Marzabotto	DOL3	Massa-Pairault <i>et al.</i> 1997, 185, fig. 23.10
Nonantolana site 68	-	Cardarelli & Malnati 2003, 118, fig. 61, no.10
Reggio nell’Emilia	2	Damiani <i>et al.</i> 1992, 76, fig. 42
Mantova	4	Casini & Frontini 1986, 269, fig. 164

Their numbers increase in the later Orientalizing period, probably peaking in the Archaic period and they remain common in the post-Archaic and Hellenistic periods. Individual *pithoi* have long use-lives, creating a time-lag between their manufacture and their inclusion in an archaeological context and their limited typological variation makes them imprecise dating tools. *Pithoi* also had a variety of secondary uses (see below) and their robust walls help them survive in residual contexts, contributing to the lack of precision in their dating. Consequently, the date ranges suggested for each type are very wide and, without an independently dated context, it is difficult to be more precise than Orientalizing, Archaic or Hellenistic period. A similar situation continues into the Roman period, when the use-life of Roman *dolia* has

been conservatively estimated at 25 years of primary use, followed by potential reuse making dating *dolia* difficult to date (Peña 2007, 194–6, 209–28, 324–5).

Making *pithoi*

Using the limited ancient evidence available, and ethnographic studies of *pithos* production in contemporary Greece, the full *chaîne opératoire* of *pithos* manufacture has been analysed and described (Giannopoulou 2010, 49–77, 95–141). Table 17.10 summarizes and adapts this analysis to the Etruscan context.

There is possible evidence for *pithos* production beneath the Cinema Apollo in Florence, in the form of overfired sherds, but the associated kiln structures seem too small for large vessels (Da Vela 2019, 37–9).

Table 17.8. *Type 5 – Everted horizontal ledge-like rim with a flat top and usually a flat lower surface and with or without a short neck. Date: Orientalizing – Roman.*

Site	Local type	Reference
Caere	5	Nardi 1993, 359, figs. 540
San Giovenale	-	Backe-Forsberg 2005, fig. 90, no. 30
Tarquinia	-	Mordeglia 2001, 153, figs. 69, no. 38/68
Albegna Valley	17, 18, 21	Perkins 1999, fig. 6.2.4, nos. 3, 4, 6
Doganella	coarseware 2, type 8 and coarse creamware 1, type 3	Perkins & Walker 1990, fig. 37, no. 11, 29, no. 5
Podere Tartuchino	-	Perkins & Attolini 1992, 101–3, fig. 16, no. 6
Roselle	6	Ristori 1994, 112–3
Radicofani	-	Botarelli 2004, 120, 27, fig. 4, no. 2
Lago dell'Accesa	2a	Camporeale 1997, 100–1, fig. 13.1, 2, 4
Poggio Civitella	1 and 2	Cappuccini <i>et al.</i> 2014, fig. 42–3
Poggio Civitate di Murlo	A, A3, B	Phillips 1967, 137, fig. 24, no. 1; Campana 2001, figs. 9. nos. 2–3, 10, nos. 4–6. 11, nos. 1–4
Radicondoli	-	Cucini 1990, fig. 71, no. 2
Poggio ai Monti	-	Taddei 2009, fig. 10
Gubbio	-	Germini 2011, fig. 10, no. 5
Monteriggioni	-	Pinzuti 2004, fig. 21, no. 3
Pisa	-	Bonamici 1989, fig. 3, no. 3
Volterra	-	Pistolesi 2003, 245, fig. 12.8
Artimino	1 and 2	Giachi 1987, 165, 71–4, figs. 15, no. 269, 116, no. 273, 120, no. 295, 122, no. 302; Lenzi 2006, 127–8, nos. 17–8
Sesto Fiorentino	-	Settesoldi 2000, fig. 66, no. 4
Covignano (Rimini)	-	Scarpellini 1982, 296, fig. 158.21–3
Vagli di Sotto	-	Ciampoltrini & Notini 1987, 72, fig. 4, no. 9
Casola Valsenio	1	Massi Pasi 1982, 162, fig. 89, no. 86.47
Marzabotto	DOL3	Massa-Pairault <i>et al.</i> 1997, 185, fig. 22.4

Table 17.9. *Type 6 – Everted horizontal ledge-like rim with a flat top and distinctly hooked with an interior face that is oblique. Date: attested in the Orientalizing period at Tarquinia, but typically Hellenistic.*

Site	Local type	Reference
Casale Pian Roseto	J1–3	Murray Threipland & Torelli 1970, 82, fig. 29.1–3
Castellina del Marangone	-	Montanel Tramulla 2011, fig. 228, nos. 16–8, 29, no. 19
San Giovenale	-	Backe-Forsberg 2005, fig. 84, no. 27
Tarquinia	-	Mordeglia 2001, 153, fig. 69B, no. 250/1
Rofalco	-	Sabbatini 2014, fig. 1, no. 167, no. 72
Albegna Valley	13	Perkins 1999, fig. 6.2.4, no. 2
Doganella	coarseware 1, type 13	Perkins & Walker 1990, fig. 35, no. 4
Ghiaccioforte	complete example	Firmati & Rendini 2002, 84
Poggio Civitella	2	Cappuccini <i>et al.</i> 2014, fig. 43, PC4810
Murlo	A	Campana 2001, fig. 19.1
Volterra	-	Pistolesi 2003, 244, fig. 12.5
Fortezza Spazzavento, Monti Pisani	-	Bonamici <i>et al.</i> 2013, fig. 14, no. 21
Artimino	2	Giachi 1987, 165, 74, fig. 16, no. 274, 122, no. 303; Lenzi 2006, 127, no. 16
Marzabotto	DOL3	Massa-Pairault <i>et al.</i> 1997, 185, fig. 33.13

Table 17.10. Chaîne opératoire of Etruscan pithos manufacture.

Stage	Sub-stage	Time taken
Gathering raw materials	Selection and extraction of clay	Days or weeks
	Transport of clay to work site	
	Transport of water to work site	
	Selection and extraction of temper	
Preparation of clay	Cleaning of clay	Days
	Addition of water	
	Kneading of clay	
	Addition of temper	
Modelling of <i>pithos</i> by hand or on wheel or turntable	Forming a disc base	3 weeks
	Raising the walls with coils or slabs	
	Forming the neck	
	Forming the rim	
	Addition of decoration or handles	
	Preparation and application of surface treatment (slip or burnishing)	
Drying of <i>pithos</i>	Indoors then outdoors	Weeks or months
Firing in bonfire, pit or temporary kiln	Gathering of fuel	1–3 days
	Kiln or fire construction	
	Loading kiln	
	Firing	
	Cooling	1 day – 1 week
Interior surface treatment	Gathering and preparation of beeswax or pitch	Days
	Application of sealant to interior of <i>pithos</i>	
	Drying of sealant	
Transport	Road or sea transport to use destination	Days or weeks
Installation	Sinking in pit or placing in room	Hours
Total		At least 8 weeks

A definite *pithos* production site in Etruria has yet to be found and there is only indirect evidence for some of the stages of this production process. The clays and minerals used were mostly of relatively local origin and similar to those in coarsewares, cooking wares and tiles. An exception is in the Albegna Valley, where some *pithoi* from sites in areas of sedimentary geology contained minerals of volcanic origin, indicating the movement of either raw materials or finished *pithoi* from the volcanic areas (Perkins 1999, 184–6). There is some evidence for how *pithoi* were modelled. Regular breaks between the neck and shoulder of vessels at Caere suggests their construction in separate pieces that were subsequently joined when partially dried (Mordeglia 2001). At Poggio della Castellina del Marangone, a late seventh-sixth century BC *pithos* body sherd had a roughened surface to help attach the rim (Montanel Tramulla 2011, 674, pl. 229.23, no. 24), and at Podere Tartuchino several *pithos* rims were thickened or hooked by the addition of a coil of clay

to the exterior of a plain rim (Perkins & Attolini 1992, fig. 15, nos. 22 and 24, fig.16, nos. 1, 5 and 6). The limited range of techniques used to shape the rim is what determines the typology outlined above. Types 1 and 2 are simply everted rims; 3 and 4 are everted and thickened by the addition of a coil of clay; types 5 and 6 are everted and flattened on the top, with type 6 given an overhanging hooked profile by the potter gripping the edge of the rim with a clenched hand. The rims may have been shaped while rotating the *pithos* on a turntable or by the potter circulating around the *pithos*. There is no evidence for forming *pithoi* on a fast potting wheel in Etruria.

Before firing, the surfaces of *pithoi* were usually burnished and sometimes slipped on the interior or exterior, often in dark red. No kilns for *pithoi* have been found and so it is probable that they were fired in bonfires or pits that leave little archaeological trace. Any constructed kiln would need to have been very large to accommodate more than one *pithos* at a time. A large

kiln found at Béziers in Languedoc with a diameter of 2.65 m that held up to 7 *pithoi* is the best evidence for Archaic *pithos* firing technology yet found, but this is far from Etruria and influenced by Greek traditions introduced from Massalia in the sixth century BC (Jandot *et al.* 2009, 48–54). Analysis of *pithos* sherds excavated at Velletri suggest a firing temperature up to 1000 °C (Saviano *et al.* 2005), and two *pithos* body sherds from Poggio della Castellina del Marangone, dating to late seventh–sixth century BC had a vitrified exterior, presumably from overfiring, but this does not provide evidence for the actual firing methodology and equipment used (Giannopoulou 2010, 75–6; Montanel Tramulla 2011, 674, pl. 229.24–5, nos. 25–6).

Pitch has been detected on Etruscan *pithoi* at Podere Tartuchino and at Marsiliana where beeswax was also found (Perkins & Attolini 1992, 121–2; Camilli *et al.* 2008b, 203–4). According to Columella, beeswax was a treatment used by ‘the ancients’ for oil *pithoi* (*De re rustica* 12.52.15–6). Roman *dolia* were regularly pitched on the interior to seal the surface and reduce the porosity of the clay body: Columella describes the process in detail (*De re rustica* 12.18.5–7; cf. Peña 2007, 211–13). There is not yet evidence for Etruscan pitch production and it is rare from other periods, but the *chaîne opératoire* of *pithos* production would have been linked with that of pitch. In the Pyrenees, the *chaîne opératoire* of Roman pitch has been detailed and linked with iron working through its by-product charcoal (Orengo *et al.* 2013), and a similar interrelation is also plausible in Etruria.

Theoretical models for the organization of ceramic production and the time, skill level and technology required to produce *pithoi* suggest they were made in specialized workshops both in the ancient Aegean world and the recent past in Greece (Giannopoulou 2010, 50–4, 145–6). There is no reason to expect a different organization of production in Etruria. There are, however, indications of mutual influences between workshops producing large ceramic vessels and those producing architectural terracottas. At Acquarossa, some of the earliest roof components found there are made of dark red ceramic overpainted in white in a style similar to ‘white-on-red’ ceramics that include *pithoi*, although these are of smaller dimensions than the large *pithoi* under discussion here (Wikander 1988, 69–71; 1993; Micozzi 1994; Winter 2009, 522, 40). Where such workshops were located is an open question. Some *pithoi* were probably produced in specialized workshops in Etruscan cities. Evidence for ceramic, brick and tile production, and secondary metalworking from various locations in Marzabotto indicates that production sites were closely integrated in the urban fabric rather than separated into marginalized

artisan quarters. This is also the case at Doganella, where *amphorae* and ceramics were made, and this is a striking characteristic of Archaic urbanism in Etruria that has also been detected in the Greek world at Athens (Perkins & Walker 1990; Tsakirgis 2005). At Caere and Veii, there is evidence for some larger craft zones within the urban area, and also some association between crafts and sanctuaries at Marzabotto and elsewhere (Belelli Marchesini 2015, 2017; Bellelli 2017; Morpurgo *et al.* 2017, 113–8). Later, in Roman period Etruria, there is clear evidence for urban production of *pithoi*, for example at Cosa and notably at Rome itself (Steinby 1981; Ciampoltrini 1992). In other crafts, patterns of workshop dispersal or nucleation, variations in size from small family operations to large nucleated concentrations and associations with sanctuaries are typical of central Italy (Nijboer 2004) and should be expected with *pithoi*.

Rural production is also a possibility: size made *pithoi* difficult to transport to the location where they were required and difficult to install in already completed buildings. A mobile workshop could avoid these problems. Evidence from Early Bronze Age Greece suggests *pithoi* were made and installed on location at Helike as part of house building by itinerant craftspeople (Katsonopoulou *et al.* 2016), and mobility is also suggested by the transfer of *pithos*-making skills from the Aegean to Roca Vecchia in Puglia in the Final Bronze Age (Guglielmino 1999). In central coastal Etruria, volcanic minerals in a *pithos* fabric may indicate that peripatetic *pithos* makers carried their materials with them or perhaps that finished *pithoi* or raw materials were transported over land to the locations where they were needed (Perkins 1999, 184–6).

Examination of the ceramic fabrics used to make *pithoi* provides further clues about the organization of *pithos* production. Specialized workshops might be necessary to deploy technical skills required but that does not mean they produced exclusively *pithoi* (Giannopoulou 2010, 50–4, 146). At Doganella, some *pithoi* were also made using the same fabrics as used for other ceramics. At Poggio della Castellina del Marangone, Civitavecchia, *pithoi* were found in two different fabrics: one local and the other which has a regional distribution centred on Caere and Pyrgi (Montanel Tramulla 2011, 677). This distinctive cream fabric with volcanic inclusions (*chiara sabbiosa*) was also used to make coarse wares, hearths, basins, *amphorae* and architectural ceramics, suggesting a diverse output from either the city of Caere or the sanctuary at Pyrgi – or perhaps both. Most *pithoi* along with terracottas and other architectural ceramics at Poggio della Castellina del Marangone were made with the Caere-Pyrgi fabric suggesting they were imported possibly by sea

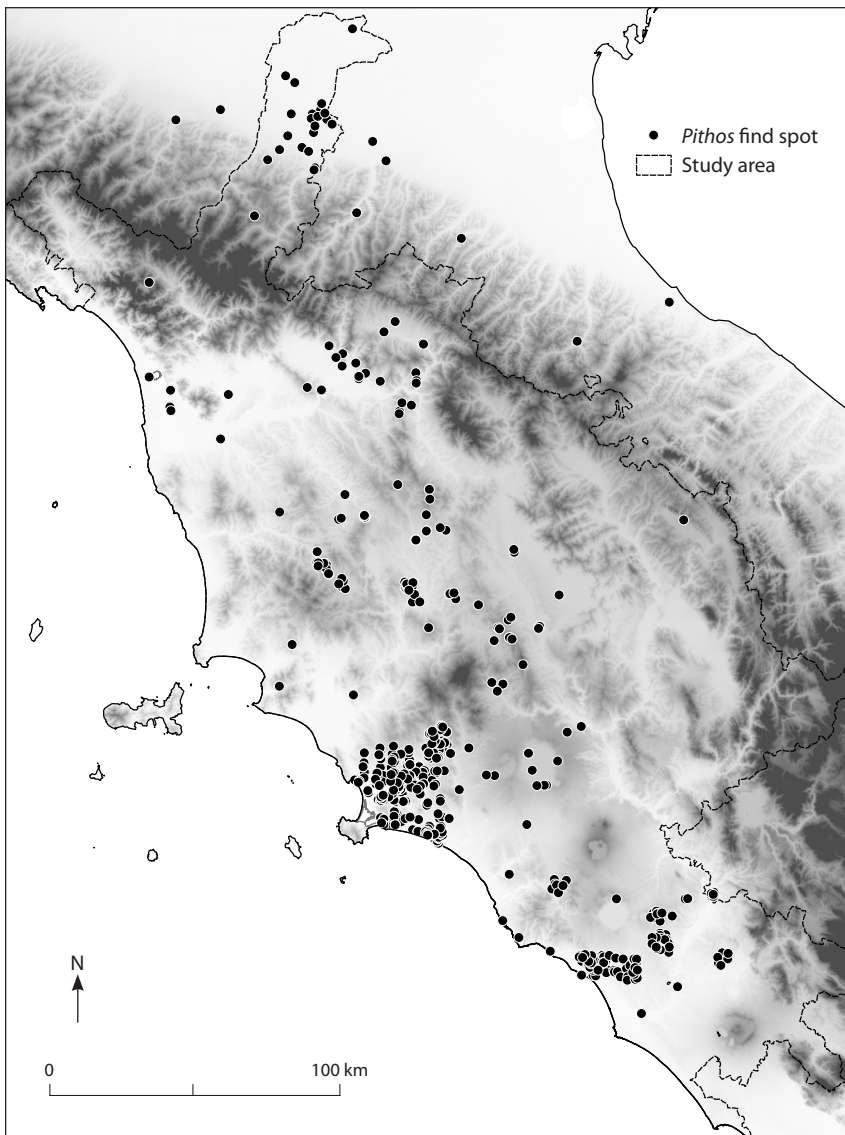


Figure 17.2. Distribution map of Etruscan pithoi within the study area in Etruria.

(Montanel Tramulla 2011, 677). Finds of ribbed *pithoi* at Tarquinia that were made in Caere, in the late seventh to early sixth century, suggest they, too, were traded (Mordeglia 2001; Catalli *et al.* 2009), and there is also a limited distribution of Caeretan stamped *pithoi* in the territory of the city (Serra Ridgway 2010, 263–4). In Liguria, there is some evidence for trade in the vessels or their contents (Delfino & Piccardi 2014), and at Genova evidence suggests the importation of large storage vessels made in the area of Pisa and Livorno, but most seem to be local or regional productions. Whichever way *pithos* manufacture and distribution was organized, a complex network of production processes and systems of exchange and communication led from the producer to the consumer of *pithoi*. The distribution map of *pithos* finds (Fig. 17.2) illustrates the extent and density of this network.

Using *pithoi*

Figure 17.2 summarizes the distribution of 3393 published examples from 921 sites in Etruria and the province of Modena in the Etruscan Po Valley. Such a large sample should reflect the reality of the ancient distribution, but ultimately, the distribution and density of *pithos* finds is strongly conditioned by the frequency and intensity of archaeological fieldwork, the original settlement density and the intensity of artefact studies. On the map, the highest density of finds is in intensively field surveyed areas and excavations where all the artefacts have been thoroughly studied. For example, in field surveys, 485 *pithos* sherds were recovered by the Albegna Valley (Perkins 1999, 146–51), and at Poggio ai Monti, a hilltop field surveyed near Pomarance southwest of Volterra, *pithoi* were by far

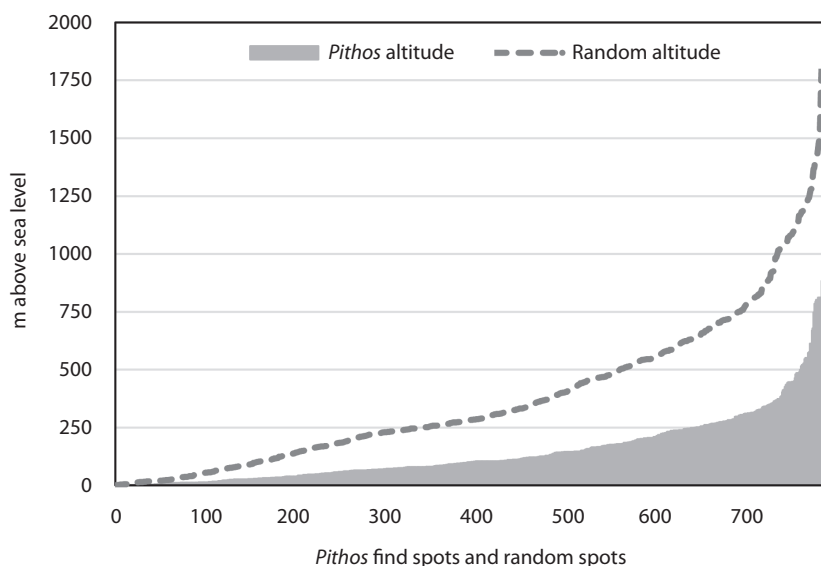


Figure 17.3. Comparison between the altitude of pithos find spots and the range of altitude in the study area.

the most common find, 18 per cent compared to 3 per cent for table wares by weight, or 22 per cent to 13 per cent by number of sherds (Taddei 2009, 4–6). In a rural excavation, 214 sherds were excavated at the small farm at Podere Tartuchino (Perkins & Attolini 1992), and urban excavations yielded 540 sherds from a house at Marzabotto (Mattioli 2010), 130 sherds from La Civita, Tarquinia (Mordeglia 2001, 149–54), and 91 from Vigna Parrocchiale, Caere (Nardi 1993). Earlier field surveys tended to focus on site locations and did not publish individual artefacts, and so the absence of *pithoi* in surveyed areas northwest of Caere, around Vetulonia, and Pisa is likely to be more apparent than real (Neppi Modona 1953; Gianfrotta 1972; Quilici Gigli 1976; Andreussi 1977; Curri 1978).

A further consideration in interpreting the distribution is that sherds of *pithoi* can be difficult to identify in surface scatters. Typically, much of an Etruscan surface scatter consists of tile and, in field conditions, it is difficult to distinguish tile fragments from *pithos* sherds. In areas where tiles are not found, *pithos* sherds are difficult to differentiate from large coarse ware sherds and are therefore less likely to be closely studied and identified. They are usually made of very similar fabrics, and so canal tiles and *pithos* sherds or coarseware may only subtly vary from one another. These practical problems make the under-reporting of *pithos* sherds highly likely since most survey methodologies do not systematically retrieve and analyse tile fragments or coarse ware body sherds. For these reasons the large sample of *pithoi* presented here is likely to be only the tip of an even larger iceberg of *pithoi* in Etruria.

Comparison between the altitude of the find spots and the range of altitude in Etruria indicates

that the distribution of *pithoi* in Etruria is not directly correlated with altitude, and therefore neither average temperature nor rainfall (Fig. 17.3). *Pithoi* are more commonly found in lower areas of Etruria: 49.5 per cent from below 100 m asl and 81.8 per cent below 250 m asl, compared to only 43.2 per cent of the land surface below 250 m asl. These warmer and dryer lowlands are also where most Etruscan settlements are found. The highest recorded *pithos* is at 882 m asl, but just 10 are recorded above 700 m and only 14 above 600 m asl. Etruscan settlements are rarely documented at such altitudes and the scarcity of *pithoi* emphasizes their link with arable agriculture and arboriculture rather than mountain pastoralism. This could be a factor in the near absence of *pithoi* from Umbria in this study, although systematic survey and excavations of Etruscan settlements are few in this region.

Some areas stand out as having a very high density of *pithoi* (Fig. 17.4) – these are the field surveyed areas near Caere and the Albegna Valley around Doganella (Enei 2001; Perkins 1999, 146–51). These clusters are likely to be the result of the intensity and methodology of research in these areas rather than a reflection of an absolute concentration in these two areas. It is highly likely that *pithoi* should have a similar density around at least Vulci and Tarquinia, in the hinterlands of these major cities, where there are not yet publications of extensive survey work and artefact analysis. The same is likely to be true for coastal northern Etruria between Vetulonia and Pisa, where no *pithoi* are recorded. The area around Veii is perhaps an intermediate case, where artefacts from the survey work in the 1950s and 60s have been published in summary (Kahane *et al.* 1968). Despite these methodological issues, there do appear to be generalized differences in density

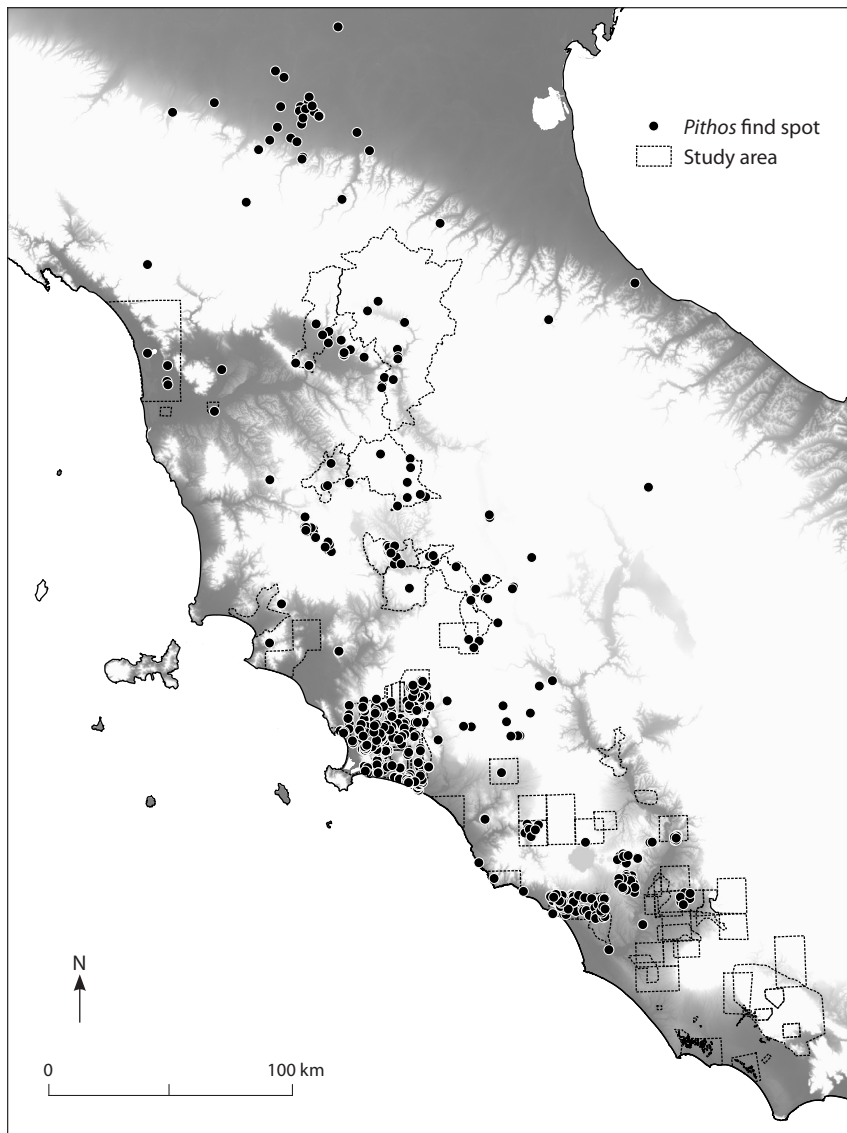


Figure 17.4. Map of sample area with land above 250 m shown in white, the lowest land in grey, dots represent pithos find spots and dotted lines areas of systematic field survey (after Palmisano et al. 2018, fig. 1).

between the coastal, lowland, urban hinterland areas (Caere, Doganella), where there is a high density of *pithoi*, and the inland hilly areas where fewer sites and fewer *pithoi* are found, for example in the Province of Siena and Florence, where urban centres are absent or smaller. Nevertheless, this does provide evidence for the importance of *pithoi* to agriculture even in areas away from the influence of urban economies.

In neighbouring areas *pithoi* are similar to those in Etruria. In Latium for example, at Rome, in the Iron Age, large jars with everted rims, or incurving shoulder and up turned rims of *pithos* type 1 have been found on the Palatine Hill (Giontella & Françoise 2009, 60, fig. 1 3–4, fig. 2 8–9, fig. 3 11–2). Further south at Satricum, Class II Storage jar/*dolio* types 7 and 8 equate to *pithos* types 2 and 3 and date from Latial phases IIA–IV (750–490 BC) (Attema et al. 2001–2002, 329–23). Other

similar examples have been found at Borgo Le Ferriere where Archaic *pithoi* were embedded in the ground in Stoa A (Maaskant-Kleibrink 1987, 101, fig. 37.33), Castel di Decima and Colleferro (Attema et al. 2001–2002, 356). At Fidene, just over the Tiber from Etruria, *pithoi* of type 4 are found from the Iron Age I, typically with rims 45–60 cm in diameter, often with circular lug handles (di Gennaro et al. 2009, 155, fig. 9.2–5, 85–6, fig. 18.9–10), similar to those found in Chiusi in central Etruria (Minetti 2004, 460, type 2) and the Po Valley (Mattioli 2013, 296, family 19B).

Northwest of Etruria in Liguria, in the Middle-Recent Bronze Age, *pithoi* tend to be cylindrical, whereas in the second Iron Age (sixth–fourth centuries BC) they are biconical or globular (Delfino & Piccardi 2014). North of the Apennines in Etruria Padana, where *pithoi* are common, Mattioli has defined

two forms of *dolio* distinguished by the presence of pommel handles below the shoulder of the vessel. They are tentatively subdivided into four types by the shape of the body, four subtypes by the overall shape of the rim and four variants by the detailed shape of the rim, although the fragmentary state of the finds makes classification difficult (Mattioli 2013, 291–6).

A few sherds of *pithos* have also been recovered from Etruscan period shipwrecks found along the coasts of Tuscany and Provence. They are associated with Etruscan, Massiliote and Punic *amphorae*, but are not proven to be Etruscan in origin (Sourisseau 1997, 397–99; Long *et al.* 2002, 50, 67; Nardò 2017, 31–42). These finds indicate that *pithoi* were used on ships but not as exclusive cargos – they perhaps contained ship’s provisions or drinking water. An image incised on a mid-seventh century *kantharos* from Veii showing a circular object with a neck and lid forming part of a ship’s cargo has been tentatively interpreted as a large two-handled vase (Arizza *et al.* 2013, 87, 99–100, fig. 17–18), perhaps a *pithos*.

Amphorae found in southern France provide evidence for seaborne trade in agricultural produce with Etruria from the end of the seventh century BC (Sourisseau 1997; Bats 2012; Nardò 2017, 290–1), however, *pithoi* do not appear there before the end of the sixth century and then they were mostly made locally in local styles (Py 2018). The few exceptions were those made at Béziers in sixth to fourth centuries BC, thought to have been first introduced via Greek *Massalia* and a group from Narbonne-Béziers with Iberian stamps (Jandot *et al.* 2009). At Lattes, where Etruscans may have settled (Py 1995, 131–33; 2008; Garmy *et al.* 2015), Etruscan *pithoi* seem to be absent and there is only limited evidence for vines in the form of grape pips in the early fifth century BC, suggesting that Etruscans did not introduce the technology for large scale wine production into Gaul (Py & Buxo i Capdevila 2001, 39–42).

In summary, bearing in mind the limitations in the evidence, from the Orientalizing period onwards, and particularly in the Archaic period, *pithoi* became a very common feature of archaeological assemblages in Etruria and neighbouring lowland areas. They are found at all types of site, rural, urban and even burial, and are particularly concentrated in areas closer to the coast and below 200 m asl. The impact of these widespread and common *pithoi* on the Etruscan economy will now be investigated.

Socio-economic agency of *pithoi*

Pithoi ensure better long-term storage than containers such as sacks, skins, crates or baskets, because they are more vermin-proof, damp-proof, robust and durable.

Given their size, *pithoi* provide an immobile form of bulk storage for liquid or semi-liquid agricultural produce, such as wine, oil or grains, enabling the secure accumulation and storage of valuable resources. Storage technology enabling the conservation of bulky resources for gradual consumption, the consumption of out-of-season produce, and the preservation of seed corn from one growing season to the next, was essential for farming communities. Bulk storage also enabled more control over the timing of any exchange of surplus produce. Secure storage moreover created the ability to manage resources and stockpile produce that might be required to fulfil social obligations such as feasting, taxation, repaying debt or provide commodities for commercial trading.

A further use for *pithoi* was processing of agricultural produce into secondary products, for example wine, olive oil, fish condiments, dairy products or wool and other fibres. *Pithoi* therefore were an essential part of many *chaînes opératoires* of agricultural production. Direct evidence for their use is scarce. In the Greek and Roman worlds, *pithoi* acted as vessels for gathering and storing pressed grape juice and olive oil (Brun 2003, 79–83, 163–4; Foxhall 2007, 138–65). *Pithoi* were also key to large scale wine production in Etruria, forming part of the technology of wine pressing for catching grape juice from the treading trough, for fermentation and for storage of wine (Perkins & Attolini 1992, 120–4; Perkins 2012). A graffito ‘*vinun*’ on a *pithos* from Gravisca (ET Ta 0.6; CIE, III, I, 1982, no. 10390) provides further evidence for use with wine (Cristofani *et al.* 1985, 143, no. 6.9.1). At Poggio della Castellina del Marangone, Civitavecchia, chemical analysis of residues suggested that a *pithos* contained wine or must, and holes in the side and lower wall were thought to drain wine from sediment and then the sediment from the *pithos* (Montanel Tramulla 2011, 678). At Poggio Colla, in northeastern Etruria, *pithoi* containing carbonized grains, including barley, were found in the phase III (c. 200 BC) buildings in small rooms that have been interpreted as a granary (Warden *et al.* 1999, 243, fig. 19; Warden & Thomas 2002, 100; Warden *et al.* 2005, 255).

Pithoi are particularly associated with both rural and urban buildings, sometimes set into floors and sometimes free-standing. Generally, the location of *pithoi* in buildings seems to reflect their multiple uses as they are found in various areas. At Podere Tartuchino, room A in the farm building contained four *pithoi* and the largest room C contained at least six *pithoi* with one near the door and another sunk into the floor in the centre of the room as part of a wine press (Perkins & Attolini 1992, 118–23). At San Giovenale, a *pithos* in Phase 2 House 2 stood by the

wall (Backe-Forsberg 2005, 56). At Poggio Alto near Marsiliana in the House of the Amphoras, *pithoi* were found lined up along the exterior of the walls of room A at the south corner of the courtyard building, both in the courtyard and outside the building. They were found with bowls, jars and basins, suggesting use in food processing. Outside the northwestern corner of the room, a half-sunken *pithos* may have functioned to catch rainwater from the roof. This possible interpretation is supported by chemical analysis that found no residues other than pitch and beeswax that would have waterproofed the vessel (Camilli *et al.* 2008a, 370–4; Camilli *et al.* 2008b, 203–4; Zifferero 2010, 12–7). Two sherds from Cerveteri had calcareous incrustations on the interior also suggesting water storage, and two others had traces of a yellowish substance on the interior (Nardi 1993, 360). Lipid analysis of sherds of *pithos* from the House of the *Dolia* at Marsiliana suggest that *pithoi* may have been multifunctional or contained mixtures of produce. Two of the three samples analysed provided possible evidence for fish and olive oil, another traces of wine and the third a vegetable oil. All provided evidence for pitch, and two for beeswax, these most likely for sealing the inner surface of the *pithoi* (Camilli *et al.* 2008b, 203–4). Pitch was also detected on the sunken *pithos* associated with a hearth from Podere Tartuchino suggesting it was not used for olive oil that reacts badly with pitch (Perkins & Attolini 1992, 121–2).

Pithoi also had domestic uses for storing bulk material such as water or oil for cooking purposes. Large *pithos*-like jars feature next to an oven in a rare representation of an Etruscan kitchen in the Tomba Golini I at Orvieto and a cook is shown about to spoon a liquid from the vessel (Maggiani 1987). At Tarquinia, excavation at Cività in sector F to the north of building beta found a *pithos* set into the ground in a room that also contained an oven in the mid-sixth century BC. There was no evidence for any specific use of the *pithos* or the oven, so this may have been a kitchen. However, the same room was later used for secondary working of copper alloy after a furnace was installed (Chiaramonte Treré 1997a, 193; 1997b, 74–5; Mordeglia 2001, 152 no. 272/7, pl.67). Half of a *pithos*, cut vertically, was repurposed at Ghiaccioforte as an oven in a kitchen with a ceramic basin and a stone tank (Firmati 2001, 59–60).

In late eighth–early seventh century Bologna, a *pithos* embedded in the centre of a hut floor in Piazza San Francesco was filled with 14,838 copper alloy objects and three of iron thought to be awaiting recycling (Tovoli 1982, 265). Another *pithos* found at Riolo near Castelfranco Emilia contained a hoard of copper alloy ingots and *ramo secco aes signatum* (Neri

1998, 64; Cardarelli & Malnati 2009). Here, *pithoi* may be functioning as a part of an industrial process and also enabling the accumulation and storage of wealth in metallic form. A further industrial use suggested for large storage jars is in salt production at the Iron Age salt pans near Tarquinia (Mandolesi 2014, 199, fig. 4). In the Comunità area of Veii, in the artisan quarter that produced ceramics, two *pithoi* lined with clay were found propped up on *tufo* blocks in a shallow depression and have been interpreted as playing a role in the processing of clay or the storage of water for potting (Belelli Marchesini 2015, 112). The use of *pithoi* as beehives is recorded in Bronze Age and modern Greece (Giannopoulou 2010, 39, 148), but the only direct Etruscan evidence for beekeeping, from Forcello near Mantua, suggests that wooden containers were used for honeycomb, although there were *pithoi* present in the room next to the hives (Casini 2007, 230).

Fragmentary *pithoi* also had secondary uses. At Trebbio near Sansepolcro, portions of *pithos* rims were reused to form the mouth of the firing chamber in Archaic kilns A and B, and a complete rim was set on the floor of kiln C (Ciacci *et al.* 2009, 65–8). Similar reuse of *pithos* rims is also reported in the Etruscan Po Valley at Marzabotto, Bologna, San Vitale, Verucchio and Savignano sul Rubicone (Ciacci *et al.* 2009, 68). In Florence, sherds of overfired *pithoi* seem to have been used as part of a kiln floor (Da Vela 2019, 37–8). Likewise at Caere a number of sherds had vitrified interiors, perhaps as a result of re-use in kiln structures, and two had traces of copper alloy slag on the interior, perhaps again as a result of re-use rather than a primary use as a crucible (Nardi 1993, 353 no. M1.10, 60–1). At Roselle, a *pithos* was re-used as a well head (Donati 1994). A number of large rim sherds were found recycled as building blocks in the first half of the seventh century at Tarquinia (Mordeglia 2001, 153, no. 250/1). Similarly, the phase II walls at Podere Tartuchino contained occasional large sherds of *pithos* as building material (Perkins & Attolini 1992, 77). They were also a valuable resource worth repairing – a sherd from Tarquinia was drilled with three holes below the rim for repair purposes (Mordeglia 2001, 150, no. 243/4). Vintage *pithoi* were a valuable resource with the potential for many forms of reuse or recycling, as also documented in the Roman period (Perkins 1999, 186; Peña 2007, 194–6;).

Burial practices in Etruria, and particularly northern Etruria, further extended the functionality of *pithoi* by using them for containing and storing cremated human remains. Inhumation in a *pithos* is common in the Eastern Mediterranean, especially Greece (Brann 1960; Vavouranakis 2014), and northeastern Sicily in the Bronze Age (Veca 2014), but unknown in Etruria.

Here *pithoi* were used to contain an entire burial assemblage, with the cremated remains usually enclosed in smaller urns placed within the *pithos* and surrounded by grave goods. The *pithos* was sealed and then buried in a pit. The large jars also had an ideological purpose, contributing to representing the status and identity of the deceased by alluding to the importance of agricultural production and the associated accumulation of wealth. Producing *pithoi* specifically for burials, or removing a valuable *pithos* from its role in agricultural production and repurposing it as a burial container, were both costly elements of burial ritual. These burial containers are rarely published in any detail, making comparisons difficult, however, many appear to be smaller than those used in agricultural production, some with diameters less than 30 cm, and they are perhaps a separate class of vessel modelled on agricultural *pithoi* or large storage jars but destined for funerary use.

Cremation burial in a *pithos* was widespread from at least the mid-eighth century BC and could be considered as an extension and scaling up of broader urn-field traditions of burial in smaller vessels, such as the classic Protovillanovan or Villanovan biconical urns. Similar burials are found in the Po Valley (where the container is called a *dolio* or *ziro*) at Spina (Aurigemma 1936, 28–31, pl. 14–15; Berti 1994), Bagnolo S. Vito (De Marinis 1982, 41) and Cortemaggiore (Saronio 1999, 17–18), for example. In northern and central Etruria, this form of burial is characteristic at Pisa (Maggiani 1990, 39), Florence (Salvini 1996, tomb 6), Prato Rosello (Poggesi 1999), Volterra (Rosselli 2009, 289–91) and in the frequent *tombe a ziro* around Chiusi (Dohan 1935; Minetti 2004, 513–21). Cremations in *pithoi* are rare at Tarquinia, Veii and Bisenzio from the first half of the eighth century BC onwards (Piergrossi 2002, 42–3). Large vessels, usually described as *dolia*, were also used in parts of Latium, for example at Osteria del'Osa, Rome, Satricum, Marino and Castel Gandolfo (Attema *et al.* 2001–2002, 356; Nizzo 2008, 114–15, 28, 70; Alessandri 2009, fig. 1.25.1–2, 47.3). Typically, these are more open, ovoid shapes rather than the globular, thick-walled *pithoi* used for storage.

Various types of *pithoi* are also found in burials as tomb goods in their own right, for example Caeretan stamped *pithoi* (Serra Ridgway 2010), Caeretan ribbed *pithoi*, some dating to the Early Orientalizing period (Nardi 1993, 351), *impasto pithoi* (ten Kortenaar 2011, 100–5; Ciampoltrini & Rendini 2012, 395–7, figs. 6–7) or 'white-on-red' painted *pithoi* (Micozzi 1994). Small *pithoi* or large storage jars are particularly common in tombs around Vulci, and often painted with geometric patterns or geometric lines in relief (Medori 2012; Regoli 2014, 77, no. 20). In the absence of scientific

testing of residues there is not yet evidence to suggest that *pithoi* deposited in tombs were actually filled with grave goods such as wine, oil or grain, but it is likely that the vessels at least symbolized such contents. The use of *pithoi* in burials draws attention to the production and consumption of food and drink and therefore to feasting as a part of funerary ceremonies and commensality, as has been suggested in Minoan Crete (Vavouranakis 2014, 216). *Pithoi* as grave goods symbolized a well-stocked tomb, with supplies for banqueting and therefore acted again as an indicator of the wealth and status of the deceased.

Pithoi also had other ideological connotations in the ancient Mediterranean through their roles in various myths. As wine containers they relate to hospitality and urban community in the encounter of Hercules and the centaur Pholos (Noël 1998; see Riva in this volume). In the same myth, negative heroic values are enacted as a terrified Eurystheus hides in a *pithos* when Hercules brings him the Erymanthian boar, as on a bronze tripod from Vulci in St Petersburg (Riis 1998, fig. 48d). In Hesiod (*Works and Days* 96–9), a *pithos* in the possession of Pandora leads to plenty of trouble (Bevan 2018), but contained some hope and metaphorically represented her body (Steiner 2013). Ultimately, returning to a funereal context, perpetually filling a pierced *pithos* in Hades is perfect torture (Painesi 2014, 158–63).

Having explored the functions of *pithoi*, the next step is to consider how *pithoi* fitted into the broader picture of agricultural development, economic growth and social change in Etruria.

Pithoi, economic development and inequality

Five elements of agricultural innovation have been identified as important in increasing production of food and related secondary products: crops, animals, growing conditions, management practices and implements (Van der Veen 2010). Van der Veen argues that agricultural change is usually incremental, and when several innovations (rather than first inventions) together become embedded and start to have long term effects on society, then some sort of agricultural revolution is taking place. I would like to suggest that the widespread adoption of *pithoi* was just such an innovation.

At approximately the same time that *pithoi* became widespread in the second quarter of the first millennium BC, the pollen record indicates an increase in the number of cultivated trees – olives, walnuts, sweet chestnuts and vines (Langgut *et al.* 2019; Stoddart *et al.* 2019, 768–9). Cattle, sheep and goats were increasing in body size (Trentacoste 2020). Climatic data suggests a

gradual shift from wetter conditions of the Late Bronze Age to dryer conditions over the first half of the millennium (Finné *et al.* 2019, supp. fig. 1; Stoddart *et al.* 2019, 763). These new crops and conditions indicate the advent of new land management techniques with productive woodlands and fixed vineyards and olive groves newly structuring the landscape. New implements related to the production and consumption of wine appear from the late ninth century BC in the form of distinctive wine mixing bowls ('craters' and 'amphora-craters') and also pruning hooks (Delpino 2012) before *pithoi* appear. From the late seventh century BC, there is a qualitative leap in the evidence, with the appearance of Etruscan *amphorae* for bulk storage and transportation of wine (Cristofani 1987; Perkins 2012; Riva 2017, 240–3).

The combination of *pithoi* and *amphorae* at Etruscan rural and urban sites and the pollen evidence in Etruria provides proxy evidence for the large-scale production and exchange of arboricultural produce. In contrast to *pithoi* that provide an immobile form of agricultural storage or processing, Etruscan *amphorae* are essentially a mobile form of storage for liquids or semi-liquids that enable the transport and exchange of primary or secondary agricultural produce. The organization of this productive activity both required and created the need for *pithoi* (and indeed *amphorae*) (Perkins 2012; Riva 2017, 240–3). The previously noted concentrations of *pithoi* in coastal areas, on current evidence, coincide with the area where Etruscan *amphorae* were mostly made, in the Cerveteri-Pyrgi area and around the Albegna Valley near Vulci (Fig. 17.5) (Sourisseau 1997), probably reflecting the connection between *pithoi* and *amphorae* at successive stages of the wine production *chaîne opératoire* (Perkins 2012). In this case, the co-occurrence of *pithoi* and *amphorae* may be an indicator of areas of agricultural change where surplus wine became more intensively produced, exported and also consumed. This broadly synchronous combination suggests that *pithoi* emerged as a new form of enabling technology as part of a broader agricultural revolution, by Van der Veen's definition, although it remains to demonstrate that *pithoi* caused long-term effects on Etruscan society.

Attempts to link agricultural change with social change have not always been successful. In Greece, evidence for a connection between the adoption of olive cultivation and social, political or economic change is poor (Foxhall 2007, 13–19). Nevertheless, the association between agricultural production and social difference was made explicit in early sixth century Athens, when Solon's reforms allocated the highest status political offices to individuals owning enough land to produce 500 *medimnoi* of crops (Rosivach 2005).

Although there is no written evidence surviving from Etruria, the material evidence for the correlation of agricultural and social change seems much stronger.

The appearance of material culture related to wine consumption in the form of ceramic vessels for storing, mixing, presenting, serving and drinking wine has been associated with the emergence of an aristocratic class in the Orientalizing period, along with the appearance of public social rituals related to foundations, rites of passage and private funeral rituals that represent status of individuals (Bartoloni *et al.* 2012). Naturally enough, I would add *pithoi* and *amphorae* to these material and social manifestations of the *chaîne opératoire* of wine use. This material association has been developed by Riva (2017) into a theoretical analysis of regimes of value and their relationship to modes of production and social relations. This has been further extended to include aspects of ideology, ritual and iconography in social and cultural change (see Riva in this volume). This work has firmly established the entanglement between wine use and social status as an element of cultural capital in Etruria. Taking some steps back down the *chaîne opératoire* of wine use and focusing on production reveals that the consumption of wine was partly facilitated by the adoption of *pithoi* to create the wine in the first place. Within the broader context of agricultural change, the adoption of *pithoi* may therefore be seen as a contributory factor in social change in a socially embedded, pre-monetary economy.

There are some threads of evidence that suggest *pithoi* could have functioned as gifts as well as providing storage and creating secondary agricultural products. A late seventh century inscription from Roselle identifies a *pithos* as a gift from Venel Laivena son of Rapale (Laviosa 1963, 43–4, fig. 1; Cristofani *et al.* 1985, 143, no. 6). The circumstances in which a *pithos* would be an appropriate, perhaps ritual gift are unknown, but the graffito on the rim testifies to a certain value attached to the vessel. It also suggests that the *pithos* had a specific transferable ownership that could perhaps be different to the ownership of its context, the house where it was found (the *Edificio con recinto*). Uniquely, *pithos* sherds from a sanctuary near San Giuliano have painted decoration of a rosette and a nude male running figure and separately a scene of copulation, dated to 530–500 BC, by similarity to Tarquinian wall paintings (Caruso 1986, 139, fig. 41, 1–21; Colonna 2014, 93). It also has an incised dedication [*min*]e *turuce Larθ Manθureie* (REE 57.77), indicating it was a gift of a man with a gentilitial name (Morandi Tarabella 2007, 298). It is exceptional and elaborately decorated and could possibly be from a well-head rather than a *pithos* but, nevertheless, it is an example of large, valued, ceramic vessel being gifted by a member

of the elite. Another sherd from Satricum in Latium has a *ante cocturam* inscription that names two male individuals perhaps with a salutation or recording a gift, and dating to the mid-sixth century BC (Gnade & Colonna 2003). Furthermore, the writing of the inscription during the manufacturing process indicates that it was designed for this purpose.

Classically, in gift exchange, giving, receiving and reciprocating are the important elements and the intrinsic value of the gift is less important than the biography status of the gift (Mauss 1954, 19–22, 37–45). Nevertheless, in the Etruscan Orientalizing period many objects that did have a high intrinsic value, due to their material or their fine workmanship were inscribed and gifted (Sciaccia 2006–2007, 282), suggesting a purely gift economy did not exist but rather a more developed economy operating with commodities, markets and weighed money (*aes rude* in Etruria) (Mauss 1954, 45). *Pithoi* were not made with precious materials, but their expensive specialist manufacture and multiple functions did give them considerable value and suggests they were an investment and an asset. The robustness of *pithoi* and their integration with buildings gave them long use-lives, making them a valued part of the agricultural infrastructure rather than individual artefacts. The common occurrence of Etruscan *pithoi* on Roman period sites in the Albegna Valley suggests *pithoi* retained their value over the long term as both part of the rural infrastructure in their primary roles and as recycled material. A similar scenario has been observed in Hellenistic Crete, where Archaic *pithoi* were conserved into the Hellenistic period at Praisos, and Minoan period *pithoi* were conserved in later periods at Trypetos and Azoria. This, along with occasional graffiti of family names, led to the interpretation of Cretan *pithoi* as functional and valuable heirlooms (Whitley 2011, 29–32).

Encouraged by artefacts bearing inscriptions that identify them as gifts, gift exchange in Etruscan Orientalizing gentilial society is the generally preferred explanation for the limited scale exchange of status-bearing artefacts between individuals within a narrow band of the social elite (Cristofani 1975; Sciaccia 2006–2007). This is generally thought to develop through time into the Archaic period to become a more commoditized system of exchange where symbolic value is replaced by commercial value (Perkins 2012, 421–4). Alongside their value as a gift and their intrinsic value, the evidence for production and distribution discussed above suggests that *pithoi* also had a value as a commodity. Their production in specialist workshops, their transport and their use producing added value for agricultural produce, suggests that they may well have functioned as commodities in a

more developed economy with markets. Their value as gifts or commodities was therefore variable and inconstant (see Riva in this volume) at different times and in differing economic circumstances.

‘Prestige goods theory’ argues that a recurrent feature of complex societies is that elites manipulate specialized craft production for political and economic ends, specifically to create dependency as a means to create or maintain social and political power by appropriating the production of the majority (Schortman & Urban 2004, 188–92). In Etruria, a close association has been noted between elites and the manufacture of fine *bucchero* ceramics, silverwork and ivory carving (Gran Aymerich 1995), all materials used for vessels connected with wine consumption. Elite appropriation of new roofing technology has also been noted as a means of acquiring status (Riva 2010, 69–71) and this technology is similar to that used with *pithoi*. The widespread rural distribution of *pithoi* indicates that, somehow, specialized craft products were transferred into the possession of non-elite and non-urban populations.

An Etruscan agrarian society functioning in a pre-monetary economy would find it difficult to adopt the widespread use of *pithos* due to the high capital investment required to acquire *pithoi*. This suggests that from the point of view of the Etruscan non-elite, a *pithos* would be obtainable as a commodity only by the wealthiest farmers. For others, living closer to subsistence, a *pithos* would not have been within easy economic reach, given its value – both in terms of its production costs and its potential for generating economic output. If, however, *pithoi* are considered as ‘prestige goods’ that were produced by specialist craftspeople working for the elite and then gifted by the elite to the rural population, their obligatory reception would have created indebtedness and dependence by requiring reciprocity from the non-elite. This is not to suggest that the *pithoi* were solely gifts in a purely gift economy where gifting should operate between individuals of near equal status. Here, the social practice of gifting was extended to become more like a forced loan to the non-elite who were unable to fully reciprocate: consequently, dependence was created. This provided one way of creating social inequality that would have been generated and maintained by debt and propagated by social reproduction (Graeber 2011). As is usual, we have no Etruscan textual support, but in Rome debt and associated slavery was certainly a problem in the fifth century Conflict of the Orders and subject to regulation in the Twelve Tables and perhaps by *nexum*, as it had been in Athens in the early sixth century with Solon’s reforms (Raaflaub 1986, 211–17; Bernard 2016, 321–4; Blok & Krul 2017).

The elite would also be instituting a means of translating their material wealth, more visible in Orientalizing tombs, into social control by redistributing it to both the specialized *pithos* makers and from there to the rural population. This particular prestige good also had the agency to manufacture secondary agricultural produce and provide a means of storing surplus and, therefore, had a transformative action on its recipients who could use it to increase the range and volume of their own agricultural produce. This, potentially, might enable the rural indebted to materially reciprocate to their benefactors by paying off debt or perhaps even participate in market exchange. Thus, at the same time, through control of access to capital, technology and markets, the elite both bound to themselves the non-elite population, whether rural or urban, through the creation of debt and also increased the volume of production with the potential to generate economic growth.

This chain of economic connections would also have facilitated the expansion of rural settlement into new areas that is well documented in southern Etruria in the Orientalizing and Archaic periods (Potter 1979; Rendeli & Cristofani 1993; Tartara 1999; Perkins 1999, 52–92; Hemphill 2000; Enei 2001; Cifani 2002; 2009; 2016, 159; Cascino *et al.* 2012). During the establishment of new settlements, access to storage and processing equipment such as *pithoi* was necessary to create a profitable harvest. Any rural settler occupying new ground would require capital or some form of credit to acquire the infrastructure that would enable successful agricultural production. Credit, supplied in the form of gifted *pithoi*, would enable the elite to indent the rural population and gain possession of a portion of the production that could be marketed in urban centres or exported to other regions. In such a model, the settlement and colonization of land becomes a means of reinforcing social hierarchies and extracting value from a rural population. Furthermore, the ‘gifting’ of the rights to farm the land could operate in the same way as the ‘gifting’ of infrastructure, thereby creating further indebtedness. Add to this the need to acquire seed corn through credit with a delayed payback of at least one season, and allowing even more time to establish productive vines or olives – both closely associated with *pithoi* – and the result is perhaps a five-year period before any significant payback of credit would become possible. Such timescales might easily be extended by inevitable crop failures. Altogether these factors in land settlement and agricultural development constitute a large quantity of credit and debt, and therefore dependency in Etruscan society and economy.

This analysis provides a mechanism to help explain how Etruscan urban settlements expanded

their control over rural areas. In the case of Vulci, this appropriation of territory has been documented by the appearance of elite tombs, increasingly far from the city (Rendeli 1993, 167–74), and the spread of rural settlement (Perkins 1999). The simultaneous intensification in the density of rural settlement, increased urban development and population growth, widespread in Archaic coastal central Italy, will have also led to changes in land ownership or occupation. In the case of Rome at the end of the sixth century BC, a comparison with later Republican period suggests that redistribution or rental of *Ager Publicus* may be a factor in this phenomenon (Cifani 2016, 159). For Etruria, there is no clear evidence for the existence of an equivalent to *Ager Publicus* or ownership of land by other institutions such as sanctuaries, but it is likely to have been an element of Etruscan state organization. State or sanctuary involvement in the economic development of land may have gradually come to replace or co-exist with gentilitial enterprises, perhaps reflecting a growing strength of Archaic urban institutions, as opposed to earlier gentilitial social structures. Archaic period changes in the structuring of urban territories such as the creation of *cuniculi* (Judson & Kahane 1963; Rasmussen 2005) and a road network, including cuttings that made it suitable for wheeled transport, documented around Veii (Ward-Perkins 1962; Tuppi 2014), indicate an increased state presence in rural areas and an increase in the integration between the city and its rural territory. At Tarquinia, the production and distribution of salt from lagoons on the coast from the Orientalizing period onwards and then later more intensive agricultural production has been associated with the integration of coast, city and territory through the evidence of ceramics in excavations at Tarquinia and Gravisca and from there further into Mediterranean exchange networks (Bonghi Jovini 2006). These are probable indicators of what could be called state investment and potentially proxy measures of economic growth. Just like *pithoi*, these interventions contributed to creating the infrastructure required for the generation and mobilization of an economic surplus.

Pithoi, economic growth and cities

The frequency of *pithos* finds is very high in urban centres and they will have performed many of the same functions as they did in rural settlements. Etruscan cities, just like any other, depended on a rural hinterland for sustenance in the form of basic food stuffs and also produce that could be transported to the city and further processed in an urban context to increase its value or exclusivity. Grapes or olives could be brought to the

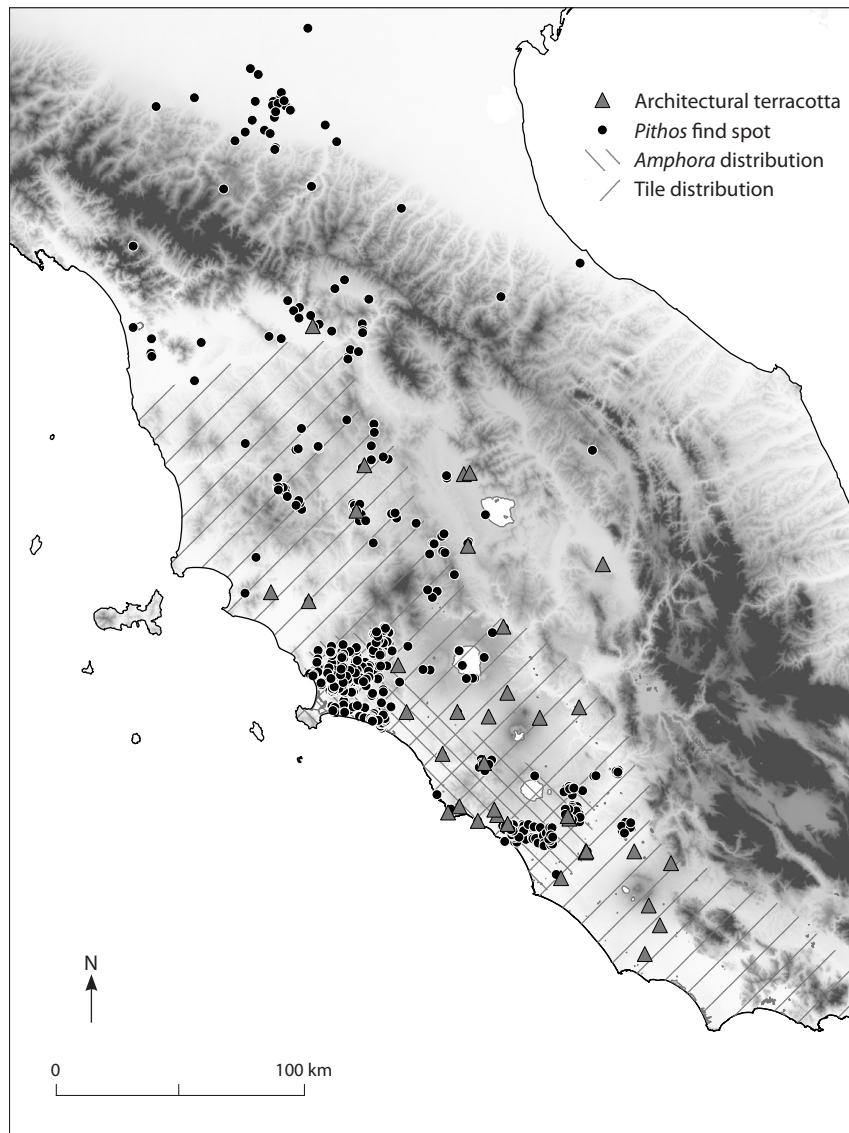


Figure 17.5. Map overlaying distribution of architectural terracottas, pithoi, amphorae and tiles in central Italy in the seventh–sixth century BC (derived from Sourisseau 1997; Winter 2009; Naso 2010).

city for processing from nearby vineyards and groves, but the concentration of population also increased the need for effective storage of foodstuffs in the city. Population density may also have increased the demand for other, non-agricultural functions of *pithoi* in cities, along with the need for facilities for city-based craft activity. This *pithos*-based storage and production capacity also contributed to economic aspects of state formation and the exercise of state power in that it enabled the storage of surplus that could then be mobilized to achieve state aims, such as warfare or the development of state infrastructure.

The increased frequency and distribution of *pithoi* during the mid-first millennium BC strongly suggests an increase in primary and secondary agricultural production. There may also have been an associated increase in the volume of individual *pithoi*, which in

turn also indicates a growth in the volume of production as Etruria urbanizes. At Poggio della Castellina del Marangone, in a small sample of vessels there was a general increase in estimated size of *pithoi* from 40 l in the Bronze Age to 150–600 l in the early and mid-Orientalizing period. In the late Orientalizing and Archaic period, size reduced back to 40 l. Subsequently, in the Hellenistic period it increased again to 92–527 l. This has been linked to more sophisticated ceramic technology in the earlier period, and in the Hellenistic – to a greater economic need for on-site storage. A similar variation in size through time is suggested by the study of a sample of 48 storage jars and *pithoi* from central Italy and elsewhere (Calvo Garcia 2011; Montanel Tramulla 2011, 677–8).

This widespread adoption of *pithos*-based technology was a technological innovation that increased the

carrying capacity of the Etruscan economy providing the population with increased nutrition and therefore enabling it to grow in size. The growth in productive and storage capacity runs alongside an increase in the density of rural settlement and the intensification of urban settlements, both indicators of and facilitators of population growth. Without statistics, it is difficult to be precise, but if the increase in production outstripped the increase in population, Etruria would have been experiencing economic growth, to use the modern term (Temin 2013, 231–3). *Pithos*-based technology can therefore be seen as a driver of ancient economic growth. This proposition is supported by other aspects of the Etruscan economy. The development of trade in *amphorae* contents (particularly *pithos*-produced wine) provides evidence for an increase in production and a surplus of agricultural commodities exported to other parts of the Mediterranean (Sourisseau 1997). Increased density in *pithos* use also suggests greater facilities for storage and the increased possibility of realizing delayed returns from produce or adding value to production through secondary processing. *Pithoi* are, however, expensive pieces of infrastructure that need to generate a significant level of profit from agricultural produce to pay back the initial investment of capital before they start to contribute to real economic growth.

Further indicators provide proxy evidence for economic growth in the same period – the late seventh to sixth century BC. Increase in the body sizes of cattle, sheep and goats indicate an enhanced productivity from animal husbandry (Trentacoste 2020). Ice core samples from Col du Dome on Mont Blanc indicate a peak in lead and antimony pollution at this time that was linked to the extraction and processing of metals in the northwest Mediterranean area. Later, in the Roman period, similar pollution evidence, along with other Arctic cores, has been used as an indicator to suggest generalized economic growth (Preunkert *et al.* 2019, fig. 2).

Increased *pithos* use is paralleled by an increase in the use of heavy ceramic infrastructure technology throughout Etruria, particularly roof tiles and decorated terracotta revetments for high status buildings and temples (Winter 2009; Naso 2010). This is evidence for the generally greater sophistication of ceramic technology in this period, but not necessarily the production of these different ceramics in the same workshops. The increased use of *pithoi* is contemporary with the production of *amphorae* and the closely technologically related production of architectural terracottas and roof tiles (Fig. 16.5). Agricultural production and distribution using heavy ceramics therefore develops hand in hand with Etruscan monumental urbanism at the end of the Orientalizing period.

Conclusion

This analysis has outlined the social and economic implications of the increased frequency of *pithos* use that is documented in the archaeological record of Etruria during the middle years of the first millennium BC. The agricultural innovation that this represents takes place within and contributes to the development of a complex society undergoing increased urbanization with the transition to the Archaic period.

I hope to have illustrated how *pithos* use transformed a wide range of economic activity from the practicalities of production, the functioning of rural infrastructure and the role of *pithoi* as capital in the rural and social economy, and also acted on social structures up to the large scale of the state. I am proposing that *pithoi* were an important element in the increasing integration between different aspects of production, trade, urbanism and social development that occurred with the Etruscan transition from the Orientalizing to the Archaic period. The model I have outlined suggests *pithoi* provided a means for the wealth of the Orientalizing elite to be channelled into agricultural production and simultaneously reinforce the unequal social hierarchy. Along with this, goes a fresh vision of the mechanisms behind Etruscan methods of settling new land. Broadly, the patterns in the evidence for *pithoi* in Etruria Padana are similar to those in coastal Etruria, suggesting a similar process of economic development may have occurred there – although this is currently interpreted as a process of Etruscan colonization north of the Apennines. Making this comparison suggests that what happened in the Po Valley might be closer to agricultural innovation than colonial occupation of the soil and provides some support for Sassatelli's (2008) questioning of the colonizing hypothesis. A search for *pithoi* in Etruscan-influenced areas of Campania might provide further insights, although published *pithoi* are scarce in that region.

I have also suggested that the adoption of *pithoi* might be an indicator of, and a stimulus for economic growth. Standing back from the individual artefacts and viewing the adoption of *pithoi* as the introduction of a suite of new related technologies that interlink various *chaînes opératoires* of ceramic and agricultural production, processing and consumption suggests something of a revolution happened in the Etruscan economy. The adoption of a new *chaîne opératoire* of *amphora* technology, following Phoenician models (Perkins 2012), represents an intertwined agricultural innovation. My assertion is that *pithoi* are not just evidence for the introduction of new technologies but evidence for the development of new economic systems in Etruria.

I have pushed the *pithos* evidence to suggest they provide proxy evidence for Etruscan economic growth, something that has proved elusive in the study of the later Roman economy. The development of urban settlements in the Etruscan world was bound up with this economic growth, and just as so many other Roman things depended on their Etruscan neighbours, early Roman economic growth may have followed a similar pattern to the economic development evident in Etruria. Many of the other studies in this volume discuss scenarios of making cities in other parts of the Mediterranean; *pithoi* may also have played an important role in these and other parts of the Classical world.

Abbreviations

ET – *Etruskische Texte* (Meiser 2014).

REE – *Rivista di epigrafia etrusca*, annually in *Studi Etruschi*.

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Making cities

Large and complex settlements appeared across the north Mediterranean during the period 1000–500 BC, from the Aegean basin to Iberia, as well as north of the Alps. The region also became considerably more interconnected. Urban life and networks fostered new consumption practices, requiring different economic and social structures to sustain them. This book considers the emergence of cities in Mediterranean Europe, with a focus on the economy. What was distinctive about urban lifeways across the Mediterranean? How did different economic activities interact, and how did they transform power hierarchies? How was urbanism sustained by economic structures, social relations and mobility? The authors bring to the debate recently excavated sites and regions that may be unfamiliar to wider (especially Anglophone) scholarship, alongside fresh reappraisals of well-known cities. The variety of urban life, economy and local dynamics prompts us to reconsider ancient urbanism through a comparative perspective.

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